

## **CLAIMS**

I claim:

- 1           1.     An encaged atomic hydrogen, comprising an atomic hydrogen and a cage-like  
2     compound, said encaged atomic hydrogen having low toxicity.
- 1           2.     A pharmaceutical composition, comprising the encaged atomic hydrogen of  
2     claim 1 in an antioxidant effective amount from about 1 mg/l to about 1000 mg/l.
- 1           3.     The pharmaceutical composition of claim 2, further comprising a thiol  
2     antioxidant compound.
- 1           4.     The pharmaceutical composition of claim 3, further comprising a polyphenol  
2     compound.
- 1           5.     The pharmaceutical composition of claim 2, further comprising a liposome.
- 1           6.     The encaged atomic hydrogen of claim 1, wherein said cage-like compound is  
2     selected from the group consisting of cobalamines, silicates, silica, quartz, zeolites, clays,  
3     porphyrines, chlorophyll, salen-manganese complexes, salen cobalt complexes and transition  
4     metal cyclic organic complexes.
- 1           7.     A method of producing an encaged atomic hydrogen, comprising the steps of:  
2           a.     producing an atomic hydrogen by electrolyzing water in a chamber having a  
3     cathode compartment containing cathode water and an anode compartment containing anode

4 water until the redox potential of said cathode water is reduced to no more than 700 mV and the  
5 pH of said cathode water becomes about 11;

6 b. adding a cage-like compound to said cathode compartment during said  
7 electrolysis to form an encaged atomic hydrogen; and

8 c. collecting said encaged atomic hydrogen from said cathode compartment.

1 8. The method of claim 7, wherein said cage-like compound is cyanocobalamin.

1 9. The method of claim 8, wherein the concentration of said cyanocobalamin is 50  
2 ppm.

1 10. The method of claim 7, further comprising the step of adding potassium chloride  
2 to both said cathode compartment and said anode compartment during said electrolysis so as to  
3 enhance the conductivity of said water.

1 11. The method of claim 10, wherein the concentration of said potassium chloride is  
2 about 200 ppm.

1 12. The method of claim 7, further comprising the step of irradiating said cathode  
2 water with a pulsed xenon flash lamp during said electrolysis.

1 13. The method of claim 12, wherein said cathode water is irradiated with said pulsed  
2 xenon flash lamp at wavelengths between 185 and 230 nm.

1 14. A method of producing an encaged atomic hydrogen, comprising the steps of:

- 2           a.     producing a hydrogen plasma;
- 3           b.     adding an effective amount of water vapor to said hydrogen plasma;
- 4           c.     introducing said hydrogen plasma and said water vapor to a quartz tube; and
- 5           d.     encaging said hydrogen plasma into a cage-like compound.

1           15.    The method of claim 14, wherein said hydrogen plasma is generated by a  
2    microwave generator.

1           16.    A method of producing an antioxidant action in the body of a patient, comprising  
2    orally administering to said patient 500 ml per day of the encaged atomic hydrogen produced  
3    according to any of claims 7, 12 or 14.